REMARKS/ARGUMENTS

Claims 1, 3-19, and 58-75 are pending. Claim 4 has been amended. Claims 60-75 have been added. Re-examination and reconsideration of the pending claims are respectfully requested.

Replacement Sheet

Please find attached a Replacement Sheet which incorporates a correction to reference numerals of Fig. 4, as approved in an Office Action mailed May 9, 2003. It has been placed on A4 paper to conform with the paper size of the previously submitted formal drawings. No new matter has been added.

Claim Rejections under 35 U.S.C. §102

In the Office Action, the Examiner rejected claims 1 and 59 under 35 U.S.C. §102(e) as allegedly being anticipated under Kauvar et al. (U.S. Patent No. 6,492,125 B2). Claim 58 was rejected under 35 U.S.C. §102(e) as being anticipated by Herron et al. (U.S. Patent No. 6,108,463). Such rejections are traversed as follows:

Independent claim 58 is directed to a system for detecting the location and identification of a plurality of spatially resolved labels. Claim 58, as currently amended, recites labels comprising a plurality of signals, each signal generating an identifiable wavelength in response to an excitation energy. Claim 58 also recites a first family of labels having a first signal defining a first wavelength, and an associated second signal defining a second wavelength, wherein individual labels within the first family have associated second signals with differing wavelengths. The use and advantages of using multi-signal spectral labels can be understood with reference to figures 2A-E, and the associated text on page 27, lines 1-22 of the originally filed application for this case. As explained in the specification, multi-signal spectral labels can be used to create of families of spectral codes for identification of a large number of labels. These families of labels are particularly useful in bioassays, potentially allowing the detection and monitoring of large numbers of analytes.

The use of multi-signal spectral labels as recited in Claim 58 of the present application has not been shown nor suggested in the cited art. A single cited art reference must teach each and every element of the claim to establish anticipation under 35 U.S.C. §102. M.P.E.P. §2131. The Court of Appeals for the Federal Circuit has held that, "the identical invention must be shown in as complete detail as is contained in the .... claim." *Richardson v. Suzuki Motor Co.,* 9 U.S.P.Q.2d 1913, 1920 (Fed. Cir. 1989). The Herron et al. reference is directed toward a fluorescent assay apparatus for analyzing a biological liquid. Specifically, Herron et al. describes the use of waveguide for illuminating an excitation energy upon a flow cell containing a bioassay (col. 9, lines 2-12; Fig. 8). Although the flow cell is coupled to a detector such as a CCD for detecting wavelengths of fluorescence (col. 13, lines 48-54), different analytes of interest are tracked by labeling each tracer molecule "with *a* different colored flourophore (sic.)." (col. 13, lines 22-33; Fig. 24). Therefore, Herron et al. discloses a simple system in which each label is identified by only one signal, that signal being defined by a single fluorophore of a specific wavelength.

Applicants note that page 5 of the Office Action cites column 13, lines 34-37 of the Herron et al. reference, which describes a waveguide "*illuminated* by one or more different wavelengths of light appropriate to excite all the fluorophores located within the evanescent region of the waveguide." Although multiple wavelengths are discussed, they are only in reference to *excitation* of a group of different fluorophore labels, each label having a single, distinct identifiable wavelength. The Herron et al. reference is absent of any suggestion or teaching of using a plurality of spectral signals for each label, and the lack of such a beneficial use is clearly reflected by the disclosed capabilities of the Herron et al. system. For example, the representative number of different assays that can be simultaneously performed by the system described in Herron et al. is small ("e.g. four") (col. .11, lines 37-41) compared to the hundreds or thousands of potential combinations provided by the multi-signal spectral coding system recited in the present application. For the foregoing reasons, Herron et al. fails to teach of multi-signal spectral labels as recited in claim 58.

Further distinguishing the present application from Herron et al. is the fact that claim 58 also recites a detector for *simultaneously* imaging spectra upon a surface of a sensor. The use and advantages of a detector for simultaneously imaging of spectra can be understood with reference to page 30, line 20 through page 31, line 5 of the originally filed application for this case. As explained in the specification, a dispersion member is optically connected to a beam splitter to simultaneously disperse wavelengths of the spectra along the surface of a detector. This simultaneous acquisition of spectral information is especially desirable for use in bioassays, where non-stationary samples often prohibit tracking by sequential imaging systems.

Applicants fail to see any remote suggestion in the Herron et al. reference for the use of simultaneous imaging of spectra upon a surface of a detector as recited by claim 58. Herron et al. discloses a fluorescent assay apparatus with a detector coupled to "a filter switching member, such as a wheel" that "houses, for example, three different band pass filters- each selective for a different fluorophore label." (col. 13, lines 44-46; Fig. 24). Under this configuration, the detector must image the spectra *sequentially* for each different wavelength range of the filter wheel. Therefore, for the three color system described in Herron et al., the detector must separately register the image a total of three times, and is incapable of simultaneous imaging of the spectra. Even in alternative embodiments where a diffraction grating or prism is used, the output is directed to "*separate* individual photodetector elements whose outputs are representative of the signal strengths in each wavelength band." (col. 13, lines 61). In another embodiment where beam splitters are employed, the portions of emitted light are directed through stationary filters in front of "individual photodetector elements." (col. 13, lines 61-65). In these alternative embodiments, at least three detectors are required for independent imaging of the three specified wavelength ranges of the spectra (red, green and blue). Therefore, Herron et al. fails to teach the simultaneously imaging of spectra upon a surface of a single detector.

Because the cited art does not teach each and every element of the claim, anticipation cannot be established under 35 U.S.C. §102. For the foregoing reasons, the present application is patently distinguished from Herron et al. and rejection of claim 58 under 35 U.S.C.

§102(e) is not appropriate. Applicants therefore respectfully request withdrawal of this rejection and the allowance of claim 58.

Regarding independent claims 1 and 59, both claims also recite a detector that *simultaneously* images spectra of a plurality of labels upon a surface. This element has not been shown nor suggested in the cited art. The Kauvar et al. reference is directed toward a system of identifying labels having a plurality of signal generating moieties such as light of different wavelengths. Specifically, Kauvar et al. describes two embodiments for identifying such signals, neither of which simultaneously image spectra upon a single detector surface. The first embodiment disclosed in Kauvar et al. is a microscope comprising a single CCD and a filter wheel (col. 5, lines 8-10; Fig. 1). Much like the Herron et al. reference, the detector in this configuration must image the spectra sequentially for each wavelength range of the filter wheel and therefore separately register the image three times for the three color system as described in Kauvar, et al. (col. 5, lines 29-39). Alternatively, the second embodiment disclosed in Kauvar et al. comprises fixed filters and multiple CCD detectors (col. 5, lines 10-13; Fig. 3). Three detectors are required for independent imaging of the three specified wavelength ranges of the spectra (red, green and blue) (Fig. 3). Therefore, the second embodiment, much like the first embodiment, fails to teach of simultaneous imaging of spectra on a single detector.

Applicants note that page 4 of the Office Action cites column 2, lines 61-65 of the Kauvar et al. reference, which states that a detector "may be employed using appropriate filters or other means, such as a prism or grating." Although a prism or grating may be used as an element of a system for simultaneously imaging spectra upon a surface of a sensor, the Kauvar et al. reference is absent of any suggestion or teaching of such a use. Rather, Kauvar et al. only teaches of a detector using a filter, prism or grating to "perceive *separately* multiple signals." (col 2, lines 62-65). The Kauvar et al. specification further distinguishes the multiple detector system from the single detector system as "simplify[ing] image registration and speed of data collection." (col. 5, lines 8-13). Simplification and speed of data collection are improved because the three-detector system does not have to sequentially register the image separately for

each bandwidth. It is therefore evident that the Kauvar et al. not only fails to contemplate simultaneous imaging of spectra on a single detector, but also teaches away from such a use.

In addition to the simultaneous imaging of spectra described above, claim 59 further recites an open optical path that is neither suggested nor taught in the Kauvar et al. reference. The use and advantages of employing an open optical path in a spectral imaging system can be understood with reference to Figures 4 and 6, and the associated text on page 28, line 35 through page 29, line 13, and page 32, lines 21 through 30 of the originally filed application for this case. As described in the specification, an open optical path having an open cross-section with significant first and second orthogonal dimensions is used in contrast to the slit or point apertures often used in dispersive systems. By using discrete point source spectral labels, which are small enough to act as their own slit, the system avoids any need for a slit or point aperture. The system disclosed in Kauvar et al. is absent of any discussion of apertures, and therefore fails to suggest or teach the use of open path optics as described in the present invention. Hence, the open optical path recited in claim 59 further distinguishes if from the Kauvar et al. reference.

For the foregoing reasons, the present application is patently distinguished from Kauvar et al. and rejection of claims 1 and 59 under 35 U.S.C. §102(e) is not appropriate. Applicants therefore respectfully request withdrawal of this rejection and the allowance of claims 1 and 59.

<u>Claim Rejections under 35 U.S.C. §103</u>

In the Office Action, the Examiner rejected claims 1, 3-7 under 35 U.S.C. §103(a) as allegedly being unpatentable over Kauvar et al. (U.S. Patent No. 6,492,125 B2) and Bawendi et al. (U.S. Patent No. 6, 326, 144), and claims 8-19 as being unpatentable over Kauvar et al. (U.S. Patent No. 6,492,125 B2) and Bawendi et al. (U.S. Patent No. 6,326,144) in view of either Lewis et al. (U.S. Patent No. 5,377,003) or Nagoshi et al. (U.S. Patent No. 5,495,334). Such rejections are respectfully reversed as follows:

Independent claim 1 and dependent claims 3-19 all recite a detector that *<u>simultaneously</u>* images spectra of a plurality of labels upon a surface. As previously noted,

Kauvar et al. not only fails to teach of simultaneous imaging of spectra on a single detector, it teaches away from using such a system. Therefore, the Kauvar et al. reference provides no suggestion or motivation for utilizing the benefits of semiconductor nanocrystals as taught by Bawendi et al., nor the optical components such as a diffractor, beam splitter, or spatial position indicator taught by Lewis et al. and Nagoshi et al., for use in a spatially resolved spectral imaging system wherein the spectra from a plurality of labels can be simultaneously imaged on a single detector.

For example, dependent claim 16 recites the use of two beam splitters, each coupled to corresponding dispersion members to disperse spectra of wavelengths along separate axes in order to resolve spectral ambiguities along a particular axis. The use and advantages of using multiple dispersion axes can be understood with reference to figures 7A-C, and the associated text on page 33, line 17 through page 34, line 12 of the originally filed application for this case. As explained in the specification, the above mentioned spectral imaging system is useful where the image is made up of discrete points and some of the images of these points fall along the dispersion axis to create an ambiguity. Because Kauvar et al. neither suggests of such an ambiguity nor teaches of how to resolve it, it accordingly does not suggest the recited optical elements that are necessary for the spectral imaging system as recited in claim 16. For the foregoing reasons, rejection of claim16, as well as claims 3-15, and 17-19, under 35 U.S.C. §103(a) is not appropriate. Applicants therefore respectfully request withdrawal of this rejection and the allowance of claims 3-19.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 650-326-2400.

Respectfully submitted,

Robert F. Kramer
Reg. No. 51,242

TOWNSEND and TOWNSEND and CREW LLP
Two Embarcadero Center, 8th Floor
San Francisco, California 94111-3834
Tel: 650-326-2400 / Fax: 415-576-0300
Attachment: Replacement Sheet
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